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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/517,436	02/10/2005	Jurgen Schulein	GAS-002	5715

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EXAMINER	
NOGUEROLA, ALEXANDER STEPHAN	
ART UNIT	**PAPER NUMBER**
1753	

DATE MAILED: 07/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/517,436	SCHULEIN ET AL.	
	Examiner	Art Unit	
	ALEX NOGUEROLA	1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 December 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 December 2004* is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *7/11/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☒ Other: *IDS of 12/10/2004/*.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention:

a) Claim 1, line 8: it is not clear what "at least in each case' refers to.

b) Claim 12, line 9: it is not clear what "at least in each case' refers to.

3. Note that dependent claims will have the deficiencies of base and intervening claims.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1, 2, and 4 are rejected under 35 U.S.C. 102(e) as being anticipated by Sampson et al. (US 2003/0022150 A1) ("Sampson").

Addressing claim 1, Sampson discloses a device for the electrochemical detection of at least one type of a biochemical molecule – contained in a liquid – from a group of predetermined biochemical molecules of different types (abstract), having

a means (10) for taking up the liquid, the means having at least one reference electrode (paragraph [0044]) and at least one counterelectrode (paragraph [0044]) and also more than two working electrodes (paragraph [0044]), at least in each case one working electrode being provided for the detection of each type of a biochemical molecule (paragraph [0046]), the working electrode being coated with a molecule that is

complementary to the biomolecule to be detected so that biochemical molecules of different types can be detected simultaneously (paragraph [0046]), a potentiostat (implied since voltammetry is disclosed - paragraphs [0099], [0030], [0038], [0039]) for generating a predetermined voltage profile – which is variable during the measurement (see paragraphs[0061] and [0052](which discloses AC signal), also implied because voltammetry is disclosed - paragraphs [0099], [0083] (cyclic voltammetry), [0030], and [0038]) – between the working electrodes and the reference electrodes, a current/voltage converter (resistor **35** and amplifier **30** together act as a current/voltage converter see paragraph [0038]) being connected downstream of each of the working electrodes (Figure 2), the current/voltage converters holding all of the working electrodes at the same potential (this is an intended use of which the circuitry of Sampson is capable since , "The electrode **18** is part of an integrated circuit that is capable of addressing each site individually or *in combination* which *controls* and monitors the relevant parameters such as *voltage*, current or capacitance [emphasis added]" (paragraph [0099]) and each current/voltage converter is immediately connected to its corresponding electrode. *Alternatively*, this limitation is inherently meet because of the shared electrical lines **26** and **27** to which the current/voltage converter is directly or indirectly connected (see Figures 2 and 1)) and means for measuring the currents flowing through the working electrodes (Figure 2 and paragraphs [0030], [0044], [0038], and [0099]).

Addressing claim 2, for the additional limitation of this claim see paragraph [0044].

Addressing claim 4, for the additional limitation of this claim see paragraph [0102].

Addressing claim 8, for the additional limitation of this claim see paragraph [021].

6. Claims 1-10 and 12-14 are rejected under 35 U.S.C. 102(e) as being anticipated by Hashimoto et al. (US 6,818,109 B2) ("Hashimoto").

Addressing claim 1, Hashimoto discloses a device for the electrochemical detection of at least one type of a biochemical molecule – contained in a liquid – from a group of predetermined biochemical molecules of different types (abstract), having

a means (Figures 8A) for taking up the liquid, the means having at least one reference electrode (col. 9:21-26) and at least one counterelectrode (col. 9:4-8) and also more than two working electrodes (Figure 8A), at least in each case one working electrode being provided for the detection of each type of a biochemical molecule (col. 5:6-18), the working electrode being coated with a molecule that is complementary to the biomolecule to be detected also that biochemical molecules of different types can be detected simultaneously (col. 5:6-18 and col. 3:62 – col. 4:5), a potentiostat (col. 9:49-

57) for generating a predetermined voltage profile – which is variable during the measurement (implied since a waveform generator is provided and using a sweeping potential is disclosed. See col.9:49-57 and col. 13:5-22) – between the working electrodes and the reference electrodes, a current/voltage converter (resistor **1610** and amplifier **1609** together in Figure 15. This is implied by col. 16:6-12, which discloses measuring the current across the resistor, which is produced by the working electrode, by measuring the voltage "down" the resistor) being connected downstream of each of the working electrodes (Figure 15), the current/voltage converters holding all of the working electrodes at the same potential (this is an intended use; in any event it is implied since one input of amplifier **1609** is grounded) and means for measuring the currents flowing through the working electrodes (implied since measuring current through the working electrode is disclosed. See col. 16:6-12).

Addressing claim 2, for the additional limitation of this claim see col. 4:15-19 and col. 9:21-26.

Addressing claim 3, for the additional limitation of this claim see col. 14:37-42.

Addressing claim 4, for the additional limitation of this claim see col. 9:57-64.

Addressing claim 5, for the additional limitations of this claim see figure 15 and note first operational amplifier **1609**.

Addressing claims 6 and 7, for the additional limitations of these claims see Figure 15. Note that the phrase "it being possible ..." in the claim does not actually require the first resistors to be connected as claimed. In any event, as seen in Figure 15 resistor **1610** is connected in between the amplifier input and the amplifier output.

Addressing claim 8, for the additional limitation of this claim see col. 3:61 – col. 4:5.

Addressing claim 9, for the additional limitations of this claim see Figure 15 and note reference electrode **1603**, which is connected to second operational amplifier **1608**.

Addressing claim 10, for the additional limitations of this claim see Figure 15 and note counter electrode **1602**, third operational amplifier **1607,** second resistor $\mathbf{R_f}$.

Addressing claim 12, Hashimoto discloses a method for the electrochemical

detection of at least one type of a biochemical molecule – contained in a liquid – from a group of predetermined biochemical molecules of different types (abstract), having the following steps

a) providing a means (Figure *A) for taking up the liquid, the means having one counter electrode (col. 9:4-8) and a least one reference electrode (col. 9:21-26) and also more than two working electrodes (Figure 8A), at least in each case one working electrode being provided for the detection of each type of a biochemical molecule (col. 5:6-18), the working electrode being coated with a molecule that is complementary to the biomolecule to be detected, so that biochemical molecules of different types can be detected simultaneously (col. 5:6-18 and col. 3:62 – col. 5:5),

b) bringing the liquid into contact with the working, counter-, and reference electrodes (col. 4:34-54),

c) simultaneously applying a predetermined voltage profile – which is variable during the measurement – between the working electrodes and the reference electrode (implied since a waveform generator is provided and using a sweeping potential is disclosed. See col.9:49-57 and col. 13:5-22), and

d) measuring the currents flowing through the working electrodes (col. 15:35-45 and col. 16:6-12), all of the working electrodes being held at the same potential during the measurement (col. 9:14-17).

Addressing claim 13, at least multiplexing is disclosed since switching circuits are provided to address the plurality of scanning lines. See col. 5:39.

Addressing claim 14, for the additional limitation of this claim see col. 9:49-64.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hashimoto et al. (US 6,818,109 B2) ("Hashimoto") in view of Blades (US 5,260,663) ("Blades') and Ho (US 4,488,556) ("Ho").

Hashimoto discloses a device for the electrochemical detection of at least one type of a biochemical molecule – contained in a liquid – from a group of predetermined biochemical molecules of different types (abstract), having

a means (Figures 8A) for taking up the liquid, the means having at least one reference electrode (col. 9:21-26) and at least one counterelectrode (col. 9:4-8) and also more than two working electrodes (Figure 8A), at least in each case one working electrode being provided for the detection of each type of a biochemical molecule (col. 5:6-18), the working electrode being coated with a molecule that is complementary to the biomolecule to be detected also that biochemical molecules of different types can be detected simultaneously (col. 5:6-18 and col. 3:62 – col. 4:5), a potentiostat (col. 9:49-57) for generating a predetermined voltage profile – which is variable during the measurement (implied since a waveform generator is provided and using a sweeping potential is disclosed. See col.9:49-57 and col. 13:5-22) – between the working electrodes and the reference electrodes, a current/voltage converter (resistor **1610** and amplifier **1609** together in Figure 15. This is implied by col. 16:6-12, which discloses

measuring the current across the resistor, which is produced by the working electrode, by measuring the voltage "down" the resistor) being connected downstream of each of the working electrodes (Figure 15), the current/voltage converters holding all of the working electrodes at the same potential (this is an intended use; in any event it is implied since one input of amplifier **1609** is grounded) and means for measuring the currents flowing through the working electrodes (implied since measuring current through the working electrode is disclosed. See col. 16:6-12).

As see in Figure 15 Hashimoto also discloses a counter electrode **1602**, third operational amplifier **1607,** second resistor $\mathbf{R_{f\,as}}$ claimed.

Hashimoto does not mention providing a capacitance in between the output of the third operational amplifier and the inverting input. Ho and Blades disclose measuring circuits for electrochemical measuring cells comprising a capacitance in between the output of the operational amplifier and the inverting input. It would have been obvious to provide such a capacitance because as taught by Ho and Blades in the invention of Hashimoto because as taught by Ho and Blades such a capacitance will smooth the signal to or from the electrode (see in Ho col. 4:49-54 and in Blades col. 5:17-21).

11. Claims 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sampson et al. (US 2003/0022150 A1) ("Sampson").

Addressing claim 12, Sampson discloses a method for the electrochemical detection of at least one type of a biochemical molecule – contained in a liquid – from a group of predetermined biochemical molecules of different types (abstract), having the following steps

a) providing a means (10) for taking up the liquid, the means having one counter electrode (paragraph [0044]) and a least one reference electrode (paragraph [0044]) and also more than two working electrodes (paragraph [0044]), at least in each case one working electrode being provided for the detection of each type of a biochemical molecule (paragraph [0046]), the working electrode being coated with a molecule that is complementary to the biomolecule to be detected, so that biochemical molecules of different types can be detected simultaneously (paragraph [0046]),

b) bringing the liquid into contact with the working, counter-, and reference electrodes (paragraph [0078]), and

c) measuring the currents flowing through the working electrodes (Figure 2 and paragraphs [0030], [0044], [0038], [0023], [0052] and [0099]; the latter three paragraphs disclose applying a voltage to an individual working electrode, selected working electrodes, or all working electrodes).

Although Sampson discloses a variable voltage profile see paragraphs[0061] and [0052](which discloses AC signal), also implied because voltammetry is disclosed - paragraphs [0099], [0083] (cyclic voltammetry), [0030], and [0038]), Sampson does not mention having all of the working electrodes being held at the same potential during the measurement; however, this is clearly within the scope of Sampson. Since Sampson

discloses that an electrical signal can be applied to all of the working electrodes and that the potential applied to each working electrode can be individually controlled (paragraph [0044]) whether all the working electrodes have the same potential applied will just depend on the measurements being made. For example, if all of the working electrodes have the same complementary biomolecule probes then all of the working electrodes may have the same voltage applied to them to get an average measurement for improved accuracy. Even if the complementary probe is different on each working electrode, the same voltage may be applied to all of the working electrodes as part of a calibration process or optimization using a standard solution with known amounts of particular biomolecules. By applying the same solution to the device at several different common voltage settings across all of the working electrodes, the measurement voltage giving the most accurate results can be ascertained.

Addressing claim 13, for the additional limitation of this claim see paragraph [0099] witch discloses addressing each site indirectly (multiplexing) or in combination (parallel).

Addressing claim 14, for the additional limitation of this claim see paragraphs [0099], [0030], [0038], [0039], which discloses voltammetry.

Specification

12. The abstract should be 150 words or less. MPEP 608.01(b).

13. "Figure 1" should be deleted from the last line of the abstract.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALEX NOGUEROLA whose telephone number is (571) 272-1343. The examiner can normally be reached on M-F 8:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, NAM NGUYEN can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Alex Noguerola
Primary Examiner
AU 1753
July 22, 2005